

Date: Thursday, 04/01/2007 11:04:53 AM
User: Linda Lacelle

Process Sheet

Split-2
20702-20

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: BLADE FITTING
Job Number	: 30112 -2		
Estimate Number	: 12300		
P.O. Number	:	Part Number	: D3488042
This Issue	: 04/01/2007 S.O. No. :	Drawing Number	: D3488 / DSK101
Prsht Rev.	: NC	Project Number	: N/A
First Issue	: / / Type : MACHINED PARTS	Drawing Revision	: B / D
Previous Run	: 29043	Material	:
Written By	:	Due Date	: 30/01/2007
Checked & Approved By	:	Qty:	10 12 Um: Each 2
Comment	: Est Rev:A New Issue 06-02-28 JLM Est Rev:B As per Rev B 06-03-30 JLM		

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
1.0	D6103003	alum billet
Comment: Qty.: 1.0000 Each(s)/Unit Total : 12.0000 Each(s) Alluminum Round Billet D6103-003 Batch: <u>52170</u>		
2.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE
Comment: MORI SEIKI CNC LATHE LARGE 1-Turn as per Dwg DSK 101 & Folio FA627 2-Deburr		
3.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE
Comment: INSPECT PARTS AS THEY COME OFF MACHINE		
4.0	HAAS1	HAAS CNC VERTICAL MACHINING #1
Comment: HAAS CNC VERTICAL MACHINING #1 1-Machine as per Folio FA627 & Dwg D3488 2-Deburr		

J.F. 07/12/31
BC 07-01-14 16
J.F. 07/12/31
BC 07-01-14 16
J.F. 08/01/14 16
2
PTO
2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector
0702-20	2-0	Qty 14 ^{remaining} on original, Qty 2 on this w/o.	E	07/02/20	2	<i>[Signature]</i> 0702-20	<i>[Signature]</i> 0702-20

NCR: 30112-2		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Design Mgr	Approval QC Inspector
			Initial Design Mgr	Action Description Design Mgr	Sign & Date			
07/01/20	H 2-0	Re machine the inside bore to remove check marks; see eng. before starting	<i>PH</i> 08.01.04 per ASF out	Worst case dimension is $\phi 2.240$ NOMINAL IS $\phi 2.450$ ACCEPTABLE DEVIATION: SEE ATTACHED ANALYSIS	<i>PH</i> per ASF out 08.01.04	<i>[Signature]</i> 08.01.04	<i>PH</i> 08.01.04 per ASF out	<i>[Signature]</i> 08.01.04

Part No: D3488-042 PAR #: _____ Fault Category: _____ NCR: Yes ☒ No ☐ DQA: D Date: 08/01/20

NOTE: Date & initial all entries

QA: N/C Closed: _____ Date: _____

Date: Thursday, 04/01/2007 11:04:54 AM
User: Linda Lacelle

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: BLADE FITTING

Job Number: 30112

Part Number: D3488042

Job Number:



Seq. #:

Machine Or Operation:

Description:

5.0

QC8

SECOND CHECK



Comment: SECOND CHECK

BL 08-01-16 (2)

6.0

QC2

INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

SEPMK 08/01/11 (2)

7.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

BL 08-01-16 (2)

8.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat White Gloss (Ref: 4.3.5.1) as per QSI 005 4.3

m106379

FL 08/01/17 (2)

9.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

BL 08-01-17 (2)

10.0

ALS71032225

INSERT



Comment: Qty.: 4.0000 Each(s)/Unit Total: 48.0000 Each(s)

Pick:

Qty Part Number Description Batch

4 ALS7-1032-225 Insert

m100489

FL

11.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Install Inserts as per Dwg D3488

FL 08/01/21 (2)

12.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

FL 08/01/21 (2)

Date: Thursday, 04/01/2007 11:04:54 AM
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Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: BLADE FITTING

Job Number: 30112

Part Number: D3488042

Job Number:



Seq. #:	Machine Or Operation:	Description :
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13.0	PACKAGING 1	PACKAGING RESOURCE #1
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(2x)

Comment: PACKAGING RESOURCE #1

Identify and Stock

Location:

F-P 22 M-L 08/01/21

14.0	QC21	FINAL INSPECTION/W/O RELEASE
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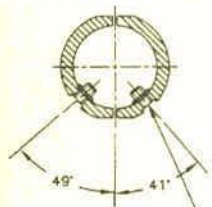
08.01.22
H

Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



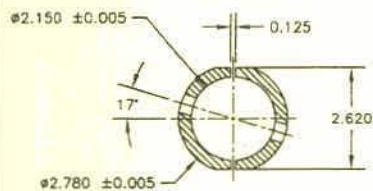
u 08.01.22



SECTION B-B

Ø0.297
C'BORE Ø0.430 x 0.100
INSTALL ALS4-1032-225 (OR AKS4-1032-225)
OR ALS7-1032-225 OR AKS7-1032-225)
INSERTS AFTER FINISH
(4 PLACES)

4



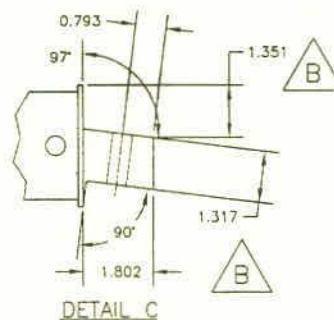
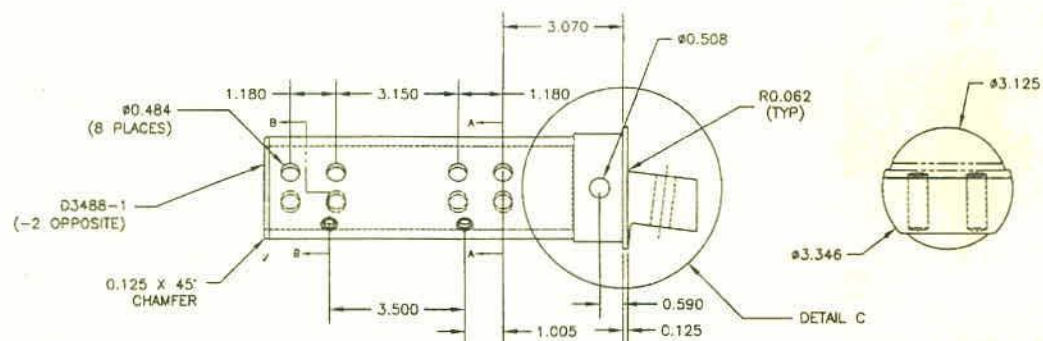
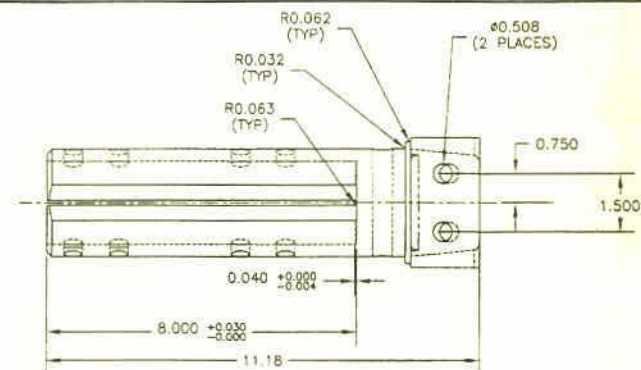
SECTION A-A

D3488-041/-042 BLADE FITTING ASSEMBLY PARTS LIST

QTY -041	QTY -042	PART NUMBER	DESCRIPTION
X		D3488-041	BLADE FITTING ASSEMBLY (LH)
	X	D3488-042	BLADE FITTING ASSEMBLY (RH)
1		D3488-1	BLADE FITTING (LH)
	1	D3488-2	BLADE FITTING (RH)
4	4	ALS4-1032-225 or AKS4-1032-225 or ALS7-1032-225 or AKS7-1032-225	INSERT

D3488-041/-042 BLADE FITTING

- MATERIAL: MAKE D3488-1/-2 FROM ALUMINUM 7075-T7351 ROUND BAR
PER QQ-A-225/9
(REF. DART MATERIAL SPEC M7075T73R)
ACID ETCH, ALODINE PER DART QSI 005 4.1
POWDER COAT WHITE (REF 4.3.5.1) PER DART QSI 005 4.3
- FINISH:
- BREAK UNMARKED SHARP EDGES 0.010 TO 0.020
- INSTALL INSERTS AFTER POWDER COAT
- ALL DIMENSIONS ARE IN INCHES
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED



DETAIL C

D3488-041 SHOWN (D3488-042 OPPOSITE)

RELEASED
06.03.15 PH
PER OS
ECN #787

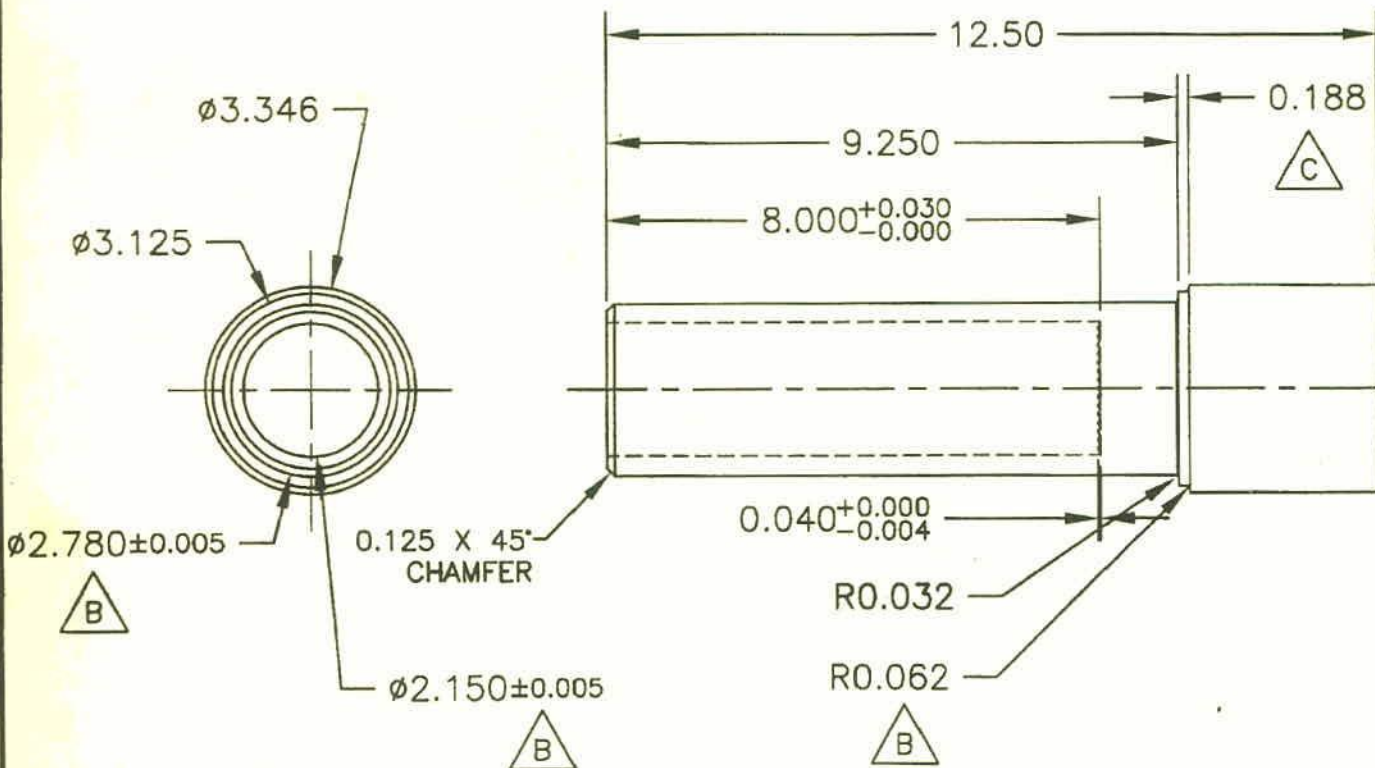
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B	06.03.15	CHANGE THICKNESS
A	05.12.20	NEW ISSUE
DESIGN	PH	DRAWN BY PH
CHECKED	PH	APPROVED PH
DATE	06.03.15	TITLE
		BLADE FITTING
		DART AEROSPACE USA, INC. PORT HADLOCK, MA
		DRAWING NO. D3488
		REV. B
		SHEET 1 OF 1
		SCALE
		1:3

DART

DESIGN	DRAWN BY	DART AEROSPACE USA, INC.	
PH	PH	PORT HADLOCK, WA	
CHECKED	APPROVED	DRAWING NO.	REV. D
PH	PH	DSK 101	SHEET 1 OF 1
DATE		TITLE	SCALE
06.05.09		D3488-1/-2 TURNING DETAIL	1:3
A	05.12.21	NEW ISSUE	
B	06.03.02	ADD TOLERANCES AND RADIUS	
C	06.04.17	0.188 WAS 0.125	
D	06.05.09	REMOVE DIAMETER FOR CHAMFER	

**DSK 101**

- 1) MATERIAL: MAKE FROM ALUMINUM 7075-T7351 ROUND BAR PER QQ-A-225/9 (REF. DART MATERIAL SPEC M7075T73R)
- 2) FINISH: NONE
- 3) BREAK UNMARKED SHARP EDGES 0.010 TO 0.020
- 4) ALL DIMENSIONS ARE IN INCHES
- 5) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED

Deviations to DSK 101

Nominal dimension: $\varnothing 2.150 \pm 0.005$

Deviation dimensions:

Dimension	Qty
$\varnothing 2.176$	1
$\varnothing 2.180$	3
$\varnothing 2.194$	1
$\varnothing 2.240$	1
$\varnothing 2.175$	1
$\varnothing 2.170$	2
$\varnothing 2.209$	1

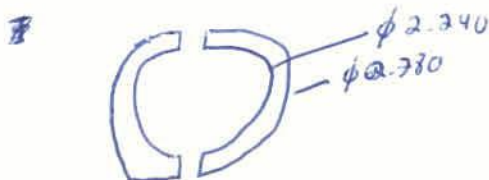
Dimension $\varnothing 2.240$ is the worst case.

Using $\varnothing 2.240$ into analysis from SR-D350-036-2 Rev. B Page 6 and 7 (dated 00.00.00)

$$\begin{array}{lll} C & = & 1.310 \text{ in} \quad (\text{unchanged}) \\ I & = & 1.446 \text{ in}^4 \\ A & = & 1.982 \text{ in}^2 \\ I/C & = & 1.104 \text{ in}^3 \\ D & = & 10.69 \text{ in} \quad (\text{unchanged}) \end{array}$$

The A, I/C, and D for the Dart blade fitting is still greater than the A, I/C, and D of the Apical blade fitting.

Therefore, the dimension $\varnothing 2.240$ is acceptable.



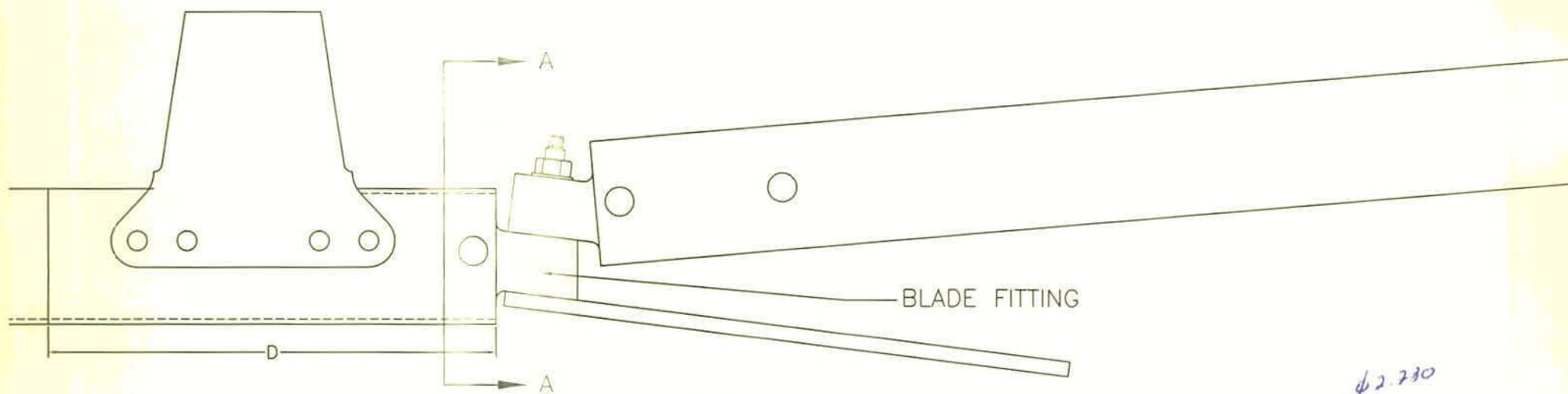
$$WALL = \frac{2.270 - 2.240}{2}$$

$$= 0.015$$

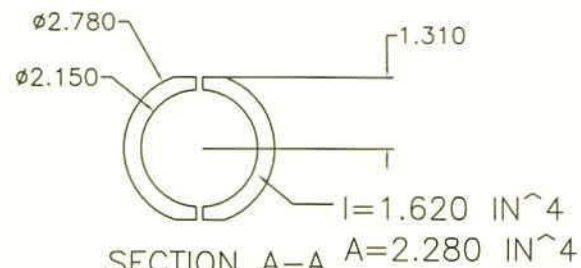
$$C' BORE = 0.270 - 0.100$$

$$= 0.170$$

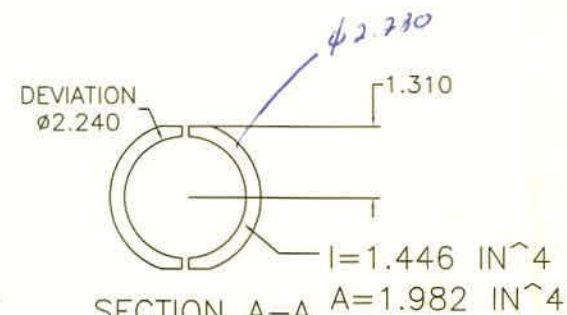
∴ ALS4-1032-225 INSERT WILL STILL BE APPLICABLE



SECTION A-A
 APICAL P/N
 20473-7/-8
 BLADE FITTING



SECTION A-A
 DART P/N
 D3488-041/-042
 BLADE FITTING



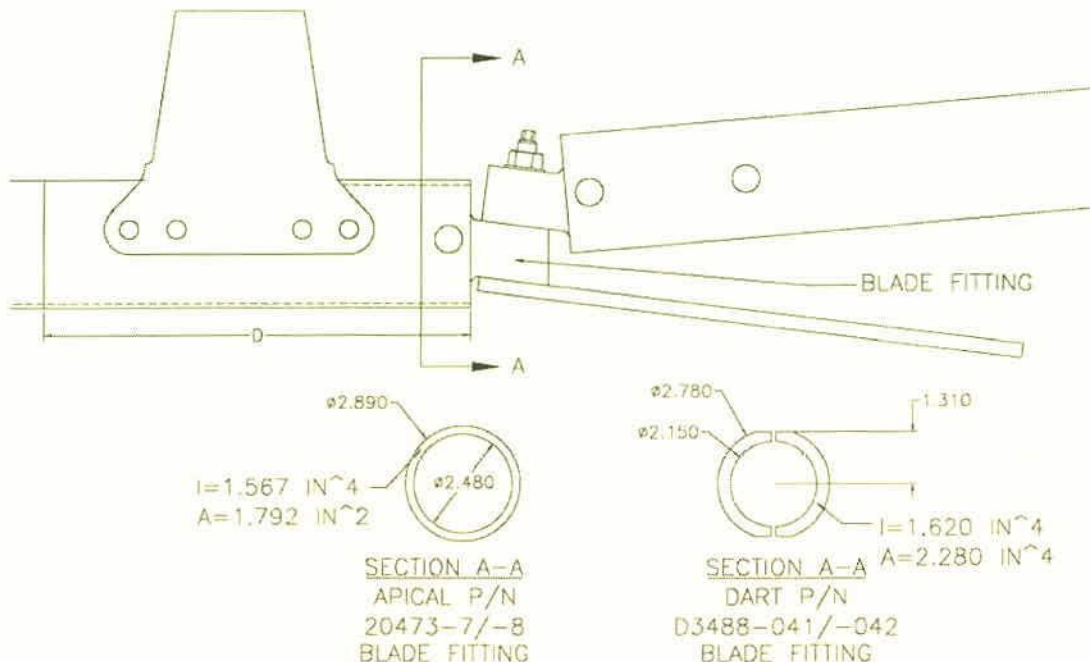
SECTION A-A
 DART P/N
 D3488-041/-042
 BLADE FITTING

For installation of the Apical Tri-bag and Apical Cylindrical Float bag systems onto OEM skid tubes; it is required that the OEM P/N 350A41-1077-24/-25 blade fitting be substituted with the Apical P/N 20473-7/-8 blade fitting. In the proposed Dart skid tube configuration, the Dart D3488-041/-042 blade fitting will replace the Apical P/N 20473-7/-8 blade fitting.

In the Dart system, blade fitting D3488-041/-042 will be used to transfer load into the web of the skid tube assembly. On the outside of the skid tube, D3488-041/-042 is dimensionally identical to the Apical P/N 20473-7/-8 blade fitting and is manufactured from the same 7075-T7351 material. Therefore, the Dart blade fitting and the Apical blade fitting have identical structural capability. The longitudinal location of the holes on the D3488-041/-042 blade fitting used to mount the skid tube are identical to the Apical P/N 20473-7/-8 blade fitting. The Dart blade fitting D3488-041/-042 has been designed to maintain original design intent for the skid tube assembly.

The following table compares the Dart D3488-041/-042 blade fitting to the Apical P/N 20473-7/-8 blade fitting.

Component	Dart D3488-041/-042	Apical P/N 20473-7/-8
Material	7075-T7351 per QQ-A-225/9	7075-T7351 per QQ-A-225/9
(I) Moment of Inertia of portion inside skid tube	1.620 in ⁴ (from D3488-041/-042 dwg)	1.567 in ⁴ (from D20473-7/-8 dwg)
(C) Distance to outer fibers	1.310 in (from D3488-041/-042 dwg)	1.445 in (from 20473-7/-8 dwg)
(A) Area at section A-A	2.280 in ²	1.792 in ²
Z=I/C at section A-A	1.234 in ³	1.084 in ³
D	10.69 in	10.53 in



Because the material used to manufacture both blade fittings is identical, the fact that the I/C, A, and D for the Dart blade fitting is greater than the I/C, A, and D for the Apical blade fitting demonstrates that the Dart blade fitting can withstand higher bending moments and shear loads than the Apical blade fitting and less localized load is transferred into the surrounding skidtube at the fwd end of the blade fitting.

Finally, the Dart skidtube installation does not change any of the Apical hardware required to install the floats onto the skidtube or attach the lift extension onto the blade fitting. Therefore, this hardware is acceptable by identity.

4.0 Conclusion

Based on the qualitative analysis performed, the Dart 636-011/-012/-013/-014 skidtubes will be as good or better than the Apical 636-011/-012/-013/-014 skidtubes. The Dart 636-011/-012/-013/-014 skidtubes will be as good or better than the Apical 636-011/-012/-013/-014 skidtubes. Additionally, the Dart 636-011/-012/-013/-014 skidtubes will be as good or better than the Apical 636-011/-012/-013/-014 skidtubes.

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